

is certainly desirable that such investigations should be made, although, in view of the investigations on various species of *Bromus* and their liability to disease made by Marshall Ward, Salmon, and others, it is doubtful whether mere microscopic investigation of the internal economy will furnish more valuable results than comparative macroscopical study of the haulm and foliage. Great physiological differences may, on the one hand, exist in conjunction with uniformity of structure, and, on the other hand, great external differences may exist without appreciable physiological diversity.

Some improved method of investigating the nature and construction of the protoplasm seems to be required, and when this is obtained our knowledge of the relation of function to structure will of necessity be much enhanced. At present the three most efficient means of preventing or combating the disease are the production of immune varieties, the use of sulphate of copper in the form of Bordeaux mixture, and the adoption of "high-moulding," by means of which access of the fungus spores to the tubers is at least in part prevented.

#### NOTES.

WE regret to announce that Dr. Selim Lemström died at Helsingfors on October 2, in the sixty-sixth year of his age. Dr. Lemström devoted much attention to experimental investigations on the uses of electricity in stimulating the growth of cereals, vegetables, and other plants.

As already noted in these columns, a distinguished party of French physicians and surgeons has during the past week paid a visit to London in order to become acquainted with our medical schools and hospitals and to study their methods and administration. About 150 gentlemen availed themselves of the opportunity, amongst others M. Lucas Championnière, Prof. Poirier, Prof. Marie, Prof. Netter, M. Louis Martin, M. Huchard, M. Triboulet, president of the French committee, and Dr. Sillonville, secretary. An English committee, with Sir W. Broadbent as president, Sir T. Barlow and Dr. Dundas Grant as treasurers, and Drs. Dawson Williams and Jobson Horne as secretaries, made arrangements for the reception and entertainment of the visitors. Visits were paid to the hospitals, general and special, the physiological laboratories of the University of London, University and King's Colleges, the Lister Institute, the Royal College of Surgeons, cancer research laboratories, the County Council laboratories at Claybury, the London School of Tropical Medicine, and to the Islington Infirmary. The visitors expressed themselves as specially pleased with the order and neatness, the decorations, &c., and the home-like comfort of the wards of our hospitals. During the visit they were the guests of the editors of the *Lancet*, Dr. and Mrs. Dundas Grant, the Dean of the Faculty of Medicine of the University of London and Mrs. Butlin, and on Wednesday evening, October 12, they were entertained at a farewell banquet at the Hotel Cecil, at which Sir W. Broadbent presided. The chairman, in proposing the health of the King, alluded to His Majesty's interest in hospitals and medical work. The other toasts were the President of the French Republic, and "Welcome and *Au revoir*," proposed by the chairman; our guests, by Dr. George Ogilvie, responded to by M. Championnière and Prof. Huchard; and the Faculty of Medicine of Paris, by Dr. Pye-Smith, responded to by Prof. Poirier, Prof. Chauffard, and M. Triboulet. The visit has been a great success, and should prove a benefit to both nations.

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REUTER reports that the commander of the *Neptune* Scientific Research Expedition to Hudson Bay and the northern waters has returned to Ottawa with several interesting mementoes of the Franklin Expedition.

MR. H. MARTIN LEAKE, of Christ's College, Cambridge, has been appointed economic botanist to the Government of the United Provinces, India, and proceeds at once to the botanic gardens, Saharanpur, N.W.P.

A CONFERENCE of members of the Museums Association and others interested will be held at Warrington on Saturday afternoon, October 29, for the purpose of discussing subjects of common interest to those concerned in the work of museums, art galleries, and kindred institutions.

THE *Electrician* announces that a congress for the purpose of discussing the production and application of Röntgen rays will be held in Berlin on April 30, 1905. The occasion is the tenth anniversary of the discovery, and Prof. Röntgen will be present as the guest of honour.

A COURSE of twelve Swiney lectures on geology will be commenced by Dr. J. S. Flett at the Victoria and Albert Museum, South Kensington, on Monday, November 7. The subject of the lectures will be "Geology—the Record and its Interpretation." Admission to the course is free.

THE King has consented to give his patronage to the Sanitary Institute, which is carrying on a large work in teaching and examining in hygiene and sanitary science, both in the United Kingdom and in other parts of the Empire.

At the opening meeting of the new session of the Royal Geographical Society, to be held at the Albert Hall on November 7, Captain Robert F. Scott will deal with the leading features of the National Antarctic Expedition. At subsequent meetings Lieut. Roys will deal with the meteorology of the expedition, Mr. Ferrar with the geology, Dr. Wilson with the zoology, and Mr. Bernacchi with the terrestrial magnetism.

THE inaugural meeting of the Association of Economic Biologists will be held at the rooms of the Linnean Society, Burlington House, on Tuesday, November 8, at 3 p.m. All who signify to Mr. W. E. Collinge, the University, Birmingham, their intention of becoming members before October 31 will constitute the list of original members.

WE learn from a note in the *Isle of Man Times* that within the last few days the large pond at the biological station and fish hatchery, Port Erin, has been in great part emptied for the purpose of examining the condition of the stock of fish of spawning size and the state of the bottom of the pond. Out of 180 large adult plaice which had been, at various times since the autumn of 1903, deposited therein, 168 were safely transferred to the lower supply tank. The condition of these fish was all that could be desired; they were thick, strong, and well fed; many were very large. There were also very many young plaice which were hatched at the station last Easter from parents in captivity—the large fish alluded to, and so have been under artificial conditions—made as natural as possible—during the whole of their existence. These young plaice, four to five months old, were from one to four inches long (the large variation in size is noteworthy), active, and well nourished. Some hundreds were picked out for experiment in rearing in small wooden tanks lately fitted up. There were also found some shrimps, some young of the cod tribe, and a small shoal of young herring (whitebait size). All these must have passed through the pumps from the sea, probably in a larval condition. The young plaice examined were found to be feeding mainly on Copepoda.

It is announced in the *Times* that the Secretary of State for India has appointed an expert committee to assist in and supervise the preparation of an abridged and revised edition of the "Dictionary of Indian Economic Products," by Sir George Watt, the editor of the original work, which was issued in seven octavo volumes, with index, between 1889 and 1893. The new edition will be compressed into two volumes, and care will be taken to give the latest figures and information available in respect to the products described, and to their commercial development. Special facilities have been afforded for Sir George Watt to carry on the work of revision at Kew, and Sir W. Thiselton-Dyer, director of the Royal Botanic Gardens there, is chairman of the committee, the other members being Mr. T. W. Holderness, secretary of the Revenue and Statistics Department, India Office; Prof. Wyndham R. Dunstan, director of the Imperial Institute; and Mr. J. S. Gamble, late of the Indian Forest Department.

A SECOND conference of local authorities, owners of foreshore, and others interested in the defence of the coast against the encroachment of the sea in the counties of Norfolk and Suffolk was held at the Guildhall, Norwich, on October 15, for the purpose of considering the report of the committee appointed by the previous conference. Dr. H. B. Walker, mayor of Lowestoft, presided. The report stated that the Government had been asked to adopt promptly such measures as would preserve the sea coasts from waste and provide a more equitable adjustment of the financial burden which now pressed exclusively upon the immediate frontagers. Mr. Nicholson (town clerk of Lowestoft) said that the Board of Trade had declined to appoint an engineer to make inquiries. A resolution was adopted in favour of communicating with other authorities in Great Britain whose districts abut upon and are liable to erosion by the sea, and with members of Parliament representing such districts, to ascertain how far they would cooperate in an application to the Government to accede to the recommendations contained in the report.

It is reported that the Antarctic relief ship *Morning* has brought home a considerable collection of natural history specimens which will supplement those obtained by the *Discovery*. A considerable amount of dredging was accomplished on the *Morning*, so that the collection consists chiefly of marine invertebrates. As she is an Admiralty ship, all the specimens collected will doubtless be handed over to the British (Natural History) Museum, where the *Discovery* collections have already been received.

In the *Irish Naturalist* for October Mr. D. R. P. Beresford records the discovery in Ireland of a second nest of the Continental wasp, *Vespa rufa austriaca*; the first was found in 1902.

In his report for 1903 (issued in the *Circulars* of the Royal Botanic Garden) the Government entomologist for Ceylon refers with satisfaction to the appreciation of the efforts of his department to aid cultivators in freeing their plantations from the attacks of noxious insects. The report deals largely with those affecting the tea-plant.

THE contents of part i. of the second volume of the quarterly issue of the *Smithsonian Miscellaneous Collections* include a continuation of Messrs. Ulrich and Bassler's revision of the Palæozoic Bryozoa; a paper by Miss E. Wood on Devonian crinoids, with descriptions of new genera and species; and a review of the triton and frog-shells by Mr. W. H. Dall, in which several new subgeneric names are proposed.

THE Society for the Protection of Birds has issued as a leaflet an abbreviation of an admirable article by Mr. W. P. Pycraft on the manufacture and sale of the so-called "osprey" plumes, which recently appeared in *Knowledge and Scientific News*. In the October number of *Bird Notes and News* the society directs attention to the marked decrease in the number of swallows visiting this country and the Continent during the last few years. The scarcity is attributed to the capture of these birds for their plumage and for the table, and it is suggested that extensive netting must take place at both migrations, though where this occurs has not been ascertained.

ACCORDING to the report of the Manchester Museum for 1903-4, it appears that the most important acquisition received by the museum during the period under review is the Cosmo Melville herbarium, which was presented by the chairman of the committee. The contents of this collection, stated to be the only private one of which the limits extend beyond the Palæarctic region, are estimated to number more than 40,000 species. It is incidentally mentioned that the skin of Napoleon's Arab charger "Marengo," which is reported to have been lately discovered in a cellar at the Louvre, was formerly in the Manchester Museum. The skeleton is, we believe, in the United Service Museum.

THE latest of the series of handbooks to the contents of the Horniman Museum at Forest Hill, issued by the London County Council, relates to the fresh-water aquariums and vivariums. In these receptacles are exhibited a large number of the common British invertebrates, together with a selection of fishes, reptiles, and amphibians. The descriptions of the various species grouped are written, as a rule, in language which can be well understood by the ordinary reader; we may point out, however, that if it is necessary to explain a term like "Porifera" it is equally necessary to do the same in the case of one like "unicellular" (p. 4), the meaning of which, we venture to think, will not be comprehended by 1 per cent. of the visitors to the museum.

IN the October issue of the *Journal of Conchology* Mr. A. J. Jukes-Browne refers to the dissatisfaction which exists among many naturalists on account of the sweeping changes proposed in zoological nomenclature by a strict and slavish adherence to the rule of priority. He points out that no less than a dozen familiar names of molluscan genera would have to be changed if those used in a certain obscure work be admitted. The evil is a very real one, and we refer to two points in connection with it. In the first place we notice that in the main only systematic naturalists adopt the proposed changes, anatomists, physiologists, &c., adhering to the old names; this at once introduces a dual system of nomenclature, which is much to be deprecated. Secondly, it may be admitted that to specialists the changes in nomenclature in their own particular groups are not very serious, as they ought to be able to keep abreast of them; but to "all-round" naturalists such changes are very serious indeed. An authoritative conference on the subject is urgently needed.

IN the *Revue générale des Sciences* (September 30) M. Ernest Fourneau describes the chemical constitution of the chief local anæsthetics, such as cocaine, eucaïne, &c., and discusses the nature of the chemical groups and their arrangement on which analgesic action seems to depend.

WE have received Mr. W. Martindale's price list of drugs, chemicals, surgical instruments, &c. The catalogue

of drugs, chemicals, and microscopical stains seems to be very complete, and we note that several pages are devoted to X-ray apparatus.

In the *Bulletin* of the Johns Hopkins Hospital for September (xv., No. 162) Dr. Howard Kelly describes an ingenious instrument, the piezometer, for measuring degrees of resistance, e.g. rigidity of the abdominal wall or the limits of a tumour. Reviews of books and some medical and medico-historical articles complete this excellent number.

In the *Bulletin international de l'Académie des Sciences de Cracovie* (No. 7, July, 1904) M. Nitsch describes some experiments on rabies in rabbits, and states that the earliest symptoms of infection are movement of the jaws and grinding of the teeth. M. Maziarski discusses the relation of the nucleus to the cytoplasm, and M. Kowalewski describes a new species of tape-worm, *Tatria biremis*, found by him in the intestine of *Podiceps auritus*.

THE Liverpool School of Tropical Medicine has issued an important series of reports on trypanosomiasis by Drs. Dutton, Todd, and Christy, which seem to establish conclusively that sleeping sickness is trypanosomiasis, although there are severe and even fatal cases of the latter in which the somnolence is not observed. In one of the expeditions of the school a blood-sucking larva of nocturnal habits was found to be abundant in many districts of the Congo.

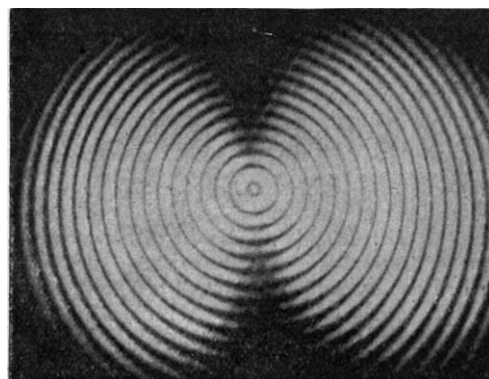
In the October number of the *Journal of Hygiene* (vol. iv., No. 4) Dr. Boycott discusses the diagnosis of ankylostoma infection with special reference to the examination of the blood, Dr. Todd describes experiments on the preparation of dysenteric toxin and antitoxin, and Dr. Castellani details researches on the etiology of dysentery in Ceylon. The Swedish Antarctic Expedition forms the subject of an article by Dr. Ekelof, the medical member of the expedition, in which he discusses its medical aspects.

An interesting report by Drs. Jobling and Woolley on Texas fever of cattle in the Philippine Islands is published by the Bureau of Government Laboratories, Manila (1904, No. 14). Some imported American cattle, after inoculation for rinderpest with the blood of native animals, rapidly died with all the symptoms of Texas fever. Investigation proved that Texas fever was endemic among the native cattle, which, however, had acquired an immunity and suffered but little from the disease. The species of tick in the islands was found by Mr. Banks, Government entomologist, to be the Australian variety (*Boophilus australis*).

THE Meteorological Department of the Transvaal (Mr. R. T. A. Innes, director) has issued its administration report for the year ending June 30, 1904. Such of the instruments ordered from this country as had then arrived there had been distributed, and continuous records of some elements would be available from July 1, 1904. Rain gauges were considered to be the most important for immediate erection, and nearly 200 voluntary observers had been supplied with these instruments. All the observations made in the colony will be published in an annual volume. Telegraphic or telephonic weather reports are received daily from twenty-nine stations, and telegrams exchanged with other colonies. The staff is at present much too small for the important work in hand.

PART iii. of the new monthly journal *Le Radium* contains a summary by Prof. Turpain of the present methods of producing high frequency currents, an account by M. M. Moulin of the  $n$ -rays and the methods used in their study, and an article by Dr. A. Darier on the physiological effects of the radiations from radio-active substances.

By slightly modifying Pocklington's method of observation, M. H. Dufet has succeeded in making measurements of the rotatory power of biaxial crystals in the direction of the optic axes. The results are described in the October part of the *Journal de Physique*. With the apparatus employed it becomes possible to make observations with much thicker plates than have hitherto been used, and in this way to observe a large number of turns of the isochromatic spirals instead of only their commencement. The paper is illustrated by photographs, and the accompanying figure represents the rings and spirals for the violet mercury



line  $\lambda$  4358 in the case of the slightly birefringent substance rhamnose. The plate used was cut normally to the stronger axis, and had a thickness of 6.27 mm. The rotation along the symmetrical optic axes of crystalline  $d$ -tartaric acid has a value of  $-114^\circ$  per cm.; it is a striking fact that the rotatory dispersion of solid tartaric acid is normal seeing that in aqueous solution the dextro-rotation of the acid undergoes very anomalous changes with variation of the wave-length. All the biaxial substances studied which were found to show rotatory polarisation in the solid state are capable of existing in enantiomorphous hemihedral forms.

An interesting paper by T. Godlewski on the dissociation of electrolytes in alcoholic solution appears in the *Bulletin* of the Cracow Academy of Sciences (1904, No. 6). The well known dilution law of Ostwald is satisfied by all the eight acids which have been examined. The order in which the acids appear, when arranged according to the magnitude of their electrolytic dissociation constants, is different from that which holds for aqueous solutions of the acids.

A VERY sensitive method of testing for minute traces of gold is described by J. Donau in the *Sitzungsberichte* of the Vienna Academy of Sciences (vol. cxiii. p. 180). A silk or woollen fibre, previously treated with a solution of tannin or a solution containing pyrogallol and stannous chloride, is immersed in the acidified solution to be examined for gold. If present, the latter is precipitated in the colloidal form on the fibre, and imparts to it a red coloration which is observed by examining the fibre under the microscope. With a silk fibre, mordanted with pyrogallol and stannous chloride,  $2 \times 10^{-9}$  gram of gold can thus be detected.

SOME interesting observations on aqueous solutions of magnesium oxalate are communicated by Kohlrausch and Mylius in the *Sitzungsberichte* of the Prussian Academy of Sciences (1904, p. 1223). By dissolving magnesium hydroxide in aqueous oxalic acid, it is possible to obtain



solutions which contain three hundred times as much magnesium oxalate as that present in the saturated solution of the hydrated salt. Electrical measurements show that the equivalent conductivity decreases at an abnormally high rate as the concentration increases. This and other phenomena furnish strong evidence in support of the view that polymerised molecules are present in the solution in considerable proportion.

A SECOND edition of Mr. Borchardt's "Arithmetical Examples," to which twenty-four pages of new exercises, oral and otherwise, have been added, has been published by Messrs. Rivingtons.

A "GEOMETRICAL Political Economy," by Mr. H. Cunyng-hame, C.B., is about to be published by the Oxford University Press. The work is an elementary treatise on the method of explaining some of the theories of pure economic science by means of diagrams.

THE October issue of the *Popular Science Monthly* is devoted entirely to the Cambridge meeting of the British Association. Dr. Pritchett, president of the Massachusetts Institute of Technology, contributes "A Traveller's View of the British Association Meeting," and in addition are included the presidential addresses of the Prime Minister, Prof. Horace Lamb, Mr. W. Bateson, Mr. Francis Darwin, Mr. Henry Balfour, Mr. Douglas Freshfield, Prof. C. S. Sherrington, and the Hon. Charles A. Parsons.

### OUR ASTRONOMICAL COLUMN.

ENCKE'S COMET.—The absence of further observations of Encke's comet has caused some doubt to be expressed as to the correctness of Herr Kopff's conclusion regarding the identity of the object which he obtained on his photograph of September 11.

In the *Astronomische Nachrichten*, No. 3970, the same observer states that he has obtained confirmatory evidence which places the identity beyond doubt, although the comet is still extremely faint and diffuse. On a photograph exposed on September 17, at 13h. 29.2m. (Heidelberg M.T.), the same object appeared in the following position:—

$$R.A. = 1h. 40.6m., \text{ dec.} = +26^\circ 14'.$$

On comparing this position, and the one determined in the first observation (September 11), with the interpolated values obtained from the ephemeris published by MM. Oculitsch and Kaminsky, it is seen that the ephemeris requires the following approximate corrections:—

$$-0.7m. \text{ and } -6'.0.$$

Herr P. Gotz, of Heidelberg, was unable to find the comet on September 6 with a 6-inch telescope.

STRUCTURE OF THE OXYGEN BANDS IN THE SOLAR SPECTRUM.—In the September number of the *Astrophysical Journal* Mr. O. C. Lester, of the Sloane Physical Laboratory, Yale University, discusses the results recently obtained by him in a research as to the nature of the oxygen bands in the solar spectrum, of which the B group is a typical example.

The purpose of the research was to investigate the relations existing between the lines of each band and between the several bands, including in the latter two bands above  $\alpha$  which do not appear to have been discussed previously.

The results may be summarised as follows:—(1) More accurate measures of the wave-lengths of the lines in groups A, B, and  $\alpha$  have been made, the  $\alpha'$  band has been measured for the first time, and a new group ( $\alpha''$ ) at  $\lambda$  5377.2 has been discovered and its lines measured. (2) It has been shown that the oxygen absorption spectrum consists of two distinct series of bands, instead of one, which occur in pairs similarly to the series of lines in a band. (3) Deslandre's first law concerning the distribution of lines in a spectral

band, viz.  $N = a + bn^2$  (where  $N$  = the vibration frequency number,  $a$  and  $b$  are constants, and  $n$  takes on all integral values from 0 to  $n$ ), is shown to be inadequate to represent the line series of the several bands. A modification of this formula suggested by Mr. Lester is

$$N = a + kn + c^{-1}n^2,$$

and this represents the series within the limits of observational errors;  $c$  and  $k$  are constants which are different for each series, although the differences are but small.

RECURRENT MARKINGS ON JUPITER.—From the inspection of several thousand drawings of Jupiter made during the last half-century, Mr. Denning has arrived at the conclusion that "features exhibiting various peculiarities of appearance and rates of motion are common to certain latitudes and break out from time to time, enduring for certain unknown intervals, then disappearing to be replaced by similar phenomena." Some exceptional outbreaks, no doubt, only take place at long intervals, whilst the evidences of others remain visible for long periods.

Mr. Denning suggests that if the old drawings could be collected and suitably discussed, considerable light might be thrown on the physical changes which are ever taking place. The value of this discussion must, in a measure, depend upon the continuity of the observations, and it is suggested that, as Jupiter is now being continuously observed and delineated, there will in a few years be ample material for such a discussion.

In the meantime Mr. Denning suggests that further insight into the wonderful atmospheric phenomena of the planet might be obtained from a study of the large number of drawings made by Schwabe between 1830 and 1860, and the 300 or 400, or more, made by Schmidt between 1843 and 1880 (the *Observatory*, October, 1904).

COMPARISON OF THE INTENSITIES OF PHOTOGRAPHIC STELLAR IMAGES.—The second chapter of the "Instructions to Variable Star Observers," of which the first chapter was summarised in these columns on September 15, is published in the October number of the *Bulletin de la Société astronomique de France*. Variable star observers will find many points of interest and instruction in the present chapter, which deals with the details of obtaining suitable photographs, and afterwards comparing and reducing the plates.

OBSERVATIONS IN THE SOUTHERN HEMISPHERE.—The Lick Observatory expedition to the southern hemisphere installed its apparatus at Santiago de Chile during the southern winter of 1903, and commenced observations on September 11 (1903).

A detailed description of the instruments in use, the observations and results, is promised for a later publication, but in the meantime Prof. W. H. Wright records several important results obtained with a powerful three-prism spectroscope attached to a Cassegrainian reflector of 94 cm. aperture, in No. 2, vol. xx., of the *Astrophysical Journal*.

The stars  $\beta$  Doradus,  $w$  Velorum,  $l$  Carinae,  $\kappa$  Pavonis, and  $\tau$  Sagittarii, have been found to have variable radial velocities.

Observations of  $\alpha$  Centauri have also been made, and indicate an average difference between the radial velocities of the two components of about 5.17 km. One probable explanation as to the cause of this difference is that it is due to the relative orbital motion of the two components, and if this is true the parallax of the system may be determined, because the visual orbit of the pair is already well known. Dr. Palmer made the computation, and obtained the following results:—

$$\begin{aligned} \pi &= 0.76'' \\ a &= 3.46 \times 10^9 \text{ km.} \\ m_1 + m_2 &= 1.9. \end{aligned}$$

$a$  = mean distance between components in kilometres,  $m_1$  and  $m_2$  = the respective masses of  $\alpha_1$  and  $\alpha_2$  Centauri in terms of the sun's mass.

The relative masses of the components, as previously determined, is about 51 : 49 in favour of the brighter. The spectrum of the latter is of the solar type, whilst in that of the fainter the iron lines are more pronounced and the calcium absorption is exceedingly heavy.